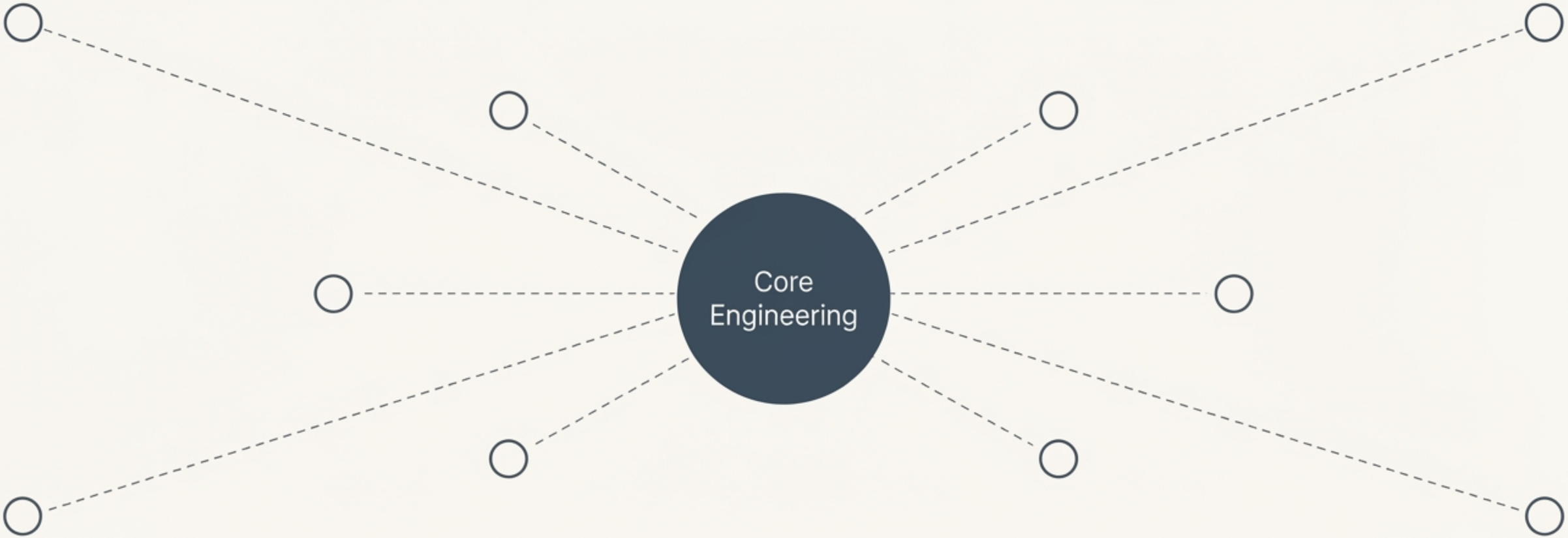
The Modern Polymath Engineer

A Portfolio of Synthesized Expertise by Tshingombe Tshitadi Fiston



SYSTEMS ENGINEERING | INNOVATION | R&D | MULTI-DISCIPLINARY FRAMEWORKS

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Architecting Solutions for a Complex World Requires More Than Specialization.

The modern technological landscape is a convergence of electrical grids, AI-driven data systems, secure networks, and emerging biotechnologies. Siloed expertise is no longer sufficient.

This portfolio documents a deliberate intellectual journey: beginning with a deep mastery of foundational engineering, expanding to the frontiers of modern technology, and culminating in a unique synthesis of these domains.

The narrative is one of purpose-driven integration, demonstrating a capacity to not only understand disparate fields but to connect them into a cohesive, actionable framework.

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Building the Foundation: Mastery in Core Electrical, Industrial, and Mechanical Engineering.

Electrical Engineering

- Deep theoretical knowledge demonstrated through study of DC/AC machines, High Voltage Engineering, power systems, and electrotechnology.
- Formal qualifications framework: NATED (National Accredited Technical Education Diploma).

Industrial & Mechanical Engineering

- Expertise in manufacturing processes, industrial safety, plant layout, and quality control (TPM).
- Knowledge of material science: properties of ferrous (steel, cast iron) and non-ferrous (aluminum, copper) metals.
- Understanding of industrial law, apprenticeship contracts, and factory acts.

Applied Physics & Mathematics

- Evidence of solving complex engineering problems using differentiation, integration, Euler's relation, and De Moivre's theorem.

$$\int \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$$

(Annotated: Arc Length Calculation)

$$e^{j\theta} = \cos\theta + j\sin\theta$$

(Annotated: Euler's Relation)

$$(\cos\theta + j\sin\theta)^n = \cos(n\theta) + j\sin(n\theta)$$

(Annotated: De Moivre's Theorem)

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From Theory to Practice: A Showcase of Applied Engineering Calculations

Exhibit A: Thermodynamics & Fluid Dynamics

$$Q_{,super} = \frac{m_s(h_4 - h_3)}{m_f}$$

Q_{in} (KJ/kg)	out KJ/kg	%
$Q_{fuel} = 32000$	$Q_{econ} = 1836$	5.74%
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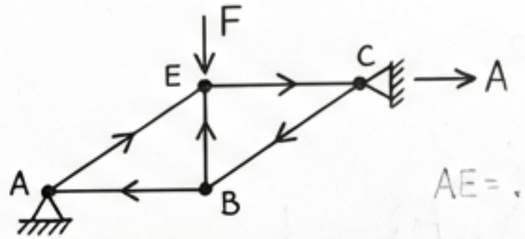
Exhibit B: Mechanical & Civil Engineering



Nodal analysis:

$AE = 455 \times \sin 39 = 227{,}5\,Nm$

$$£ = \frac{F}{A} = 32{,}7 \div 56{,}62 = 0{,}62$$

$$£ = \frac{F}{A} = 32{,}7 \div 56{,}62 = 0{,}62$$

Exhibit C: Electronics & Circuit Design

PIR-triggered main switch

- M3 ×12 mm nylon space
- M3 ×12 mm nylon space
- 2×7 ANET pink
- 125 uF cool. box
- 2 opm list
- 239 AC, outlet

$$C_{28} = \frac{C_{28} = C_{26}}{4Q.Q \times (1 + A_o))}$$

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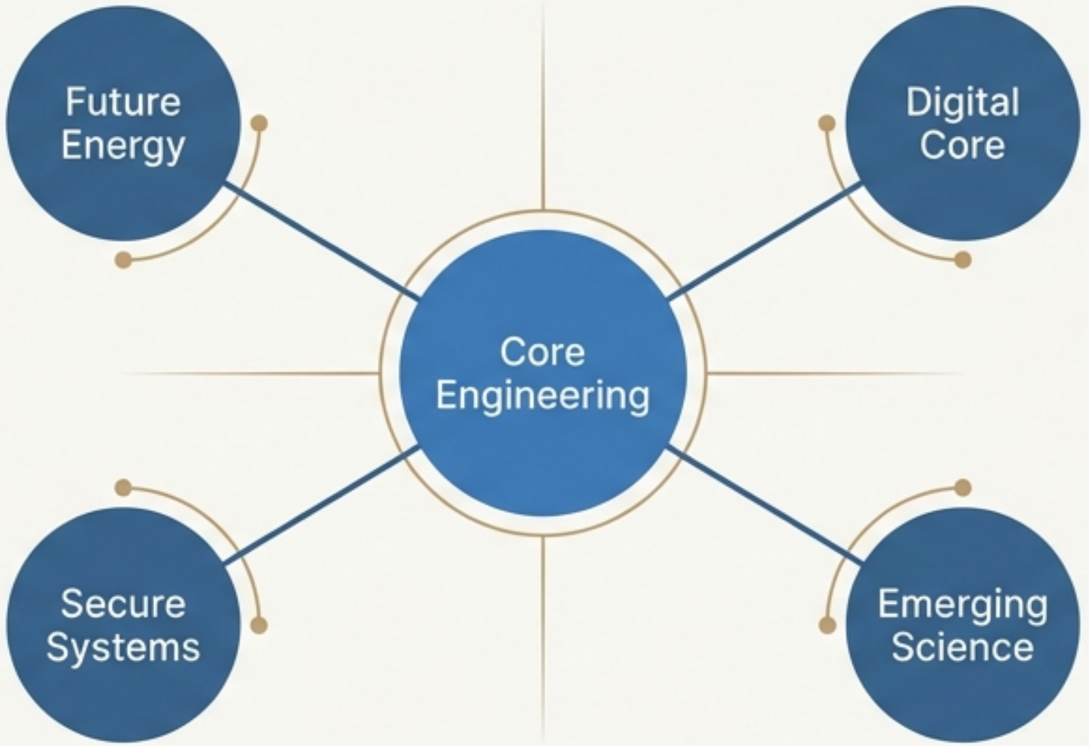
Expanding the Core: A Deliberate Journey to the Technological Frontiers



A robust foundation enables ambitious exploration. The following sections showcase a systematic expansion into critical, future-facing domains, each chosen for its strategic importance in the evolving technological ecosystem.

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Frontier 1: Architecting Future Energy & Sustainable Systems

Renewable Energy & Smart Grids

Analysis of Solar, Wind, and Bioenergy systems. Expertise in Smart Grids, IoT applications, and High Voltage Engineering for modern infrastructure. Familiarity with energy policy and ethical considerations.

Sustainable Supply Chains & Traceability

Mastery of Supply Chain Management, Logistics, and Inventory Control. Application of IoT and Blockchain for enhanced traceability and transparency.

Ecotechnology & Urban Agriculture

Knowledge of Clean Energy Technology and Ecotechnology Applications. Design of Vertical Farming Systems integrating Synthetic Biology (DNA sequencing, genetic engineering) for crop optimization.

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Frontier 2: Engineering the Digital Core.

Microsoft AI Skills Challenge:
Build next generation apps with Azure OpenAI.

Artificial Intelligence & Data Science

- Completed training modules in “Build natural language solutions with Azure OpenAI Service’, “Apply prompt engineering,” and “Implement Retrieval Augmented Generation (RAG).”
- Skills in building and evaluating regression, classification, and clustering models with Azure Machine Learning.
- Proficiency with data analysis platforms like Tableau.

Cloud Architecture & Enterprise Systems

- Experience with Azure services including AI Search, AI Document Intelligence, and Copilot Studio.
- Knowledge of enterprise systems: Database (Oracle), SAP, Microsoft Dynamics.

Software & Network Engineering

- Skills in software design, testing, and implementation (C#, Java, .net).
- Expertise in network planning, deployment, testing, and optimization.

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Frontier 3: Building Secure & Decentralized Systems

Cybersecurity & GRC

Focus on Governance, Risk, and Compliance (GRC) principles. Expertise in threat analysis, vulnerability management in digital libraries, and implementing security policies. Knowledge aligned with ISC² domains such as identity management, incident response, and risk management.

Distributed Ledger Technology (DLT) & Blockchain

Proposed Masters in "DLT Applications in Educational Technology." Understanding of Blockchain for secure credentialing, credentialing, Smart Contracts in transactions, and privacy/data security in DLT.

Immutable Data & Web Design

Proposed Masters in "Immutable Data Storage Solutions for Web Design." Knowledge of immutable data structures, state management, and performance benefits in web applications.

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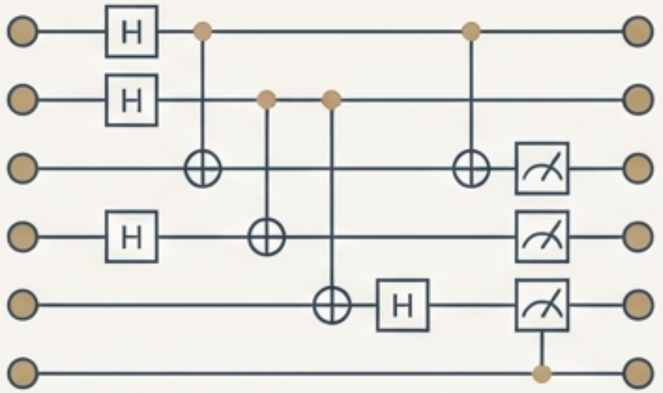
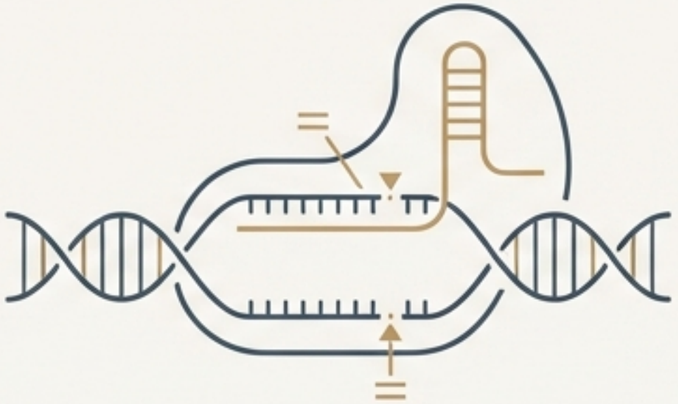
Frontier 4: Exploring the Next Scientific Frontiers.



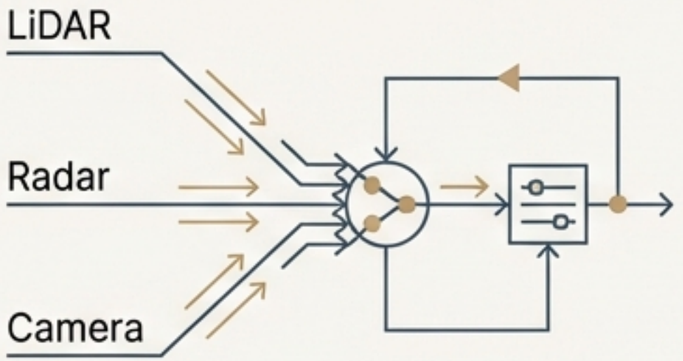
Quantum Computing

Curriculum outline for “Quantum Computing in Systems Engineering,” covering Quantum Algorithms, Algorithms, Gates, Circuits, and Information Theory. Familiarity with challenges like Quantum Supremacy and its implications.



Synthetic Biology & Genetic Engineering

Module on “Advanced Manufacturing Techniques in Genetic Engineering.” Knowledge of CRISPR, biopharmaceutical manufacturing, fermentation technology, and quality control for genetically engineered products.



Autonomous Systems

Curriculum on “Autonomous Vehicles and Drones for Electric Vehicle Engineering.” Covers sensor technologies, Machine Learning/AI for autonomous systems, IoT communication, and control systems.

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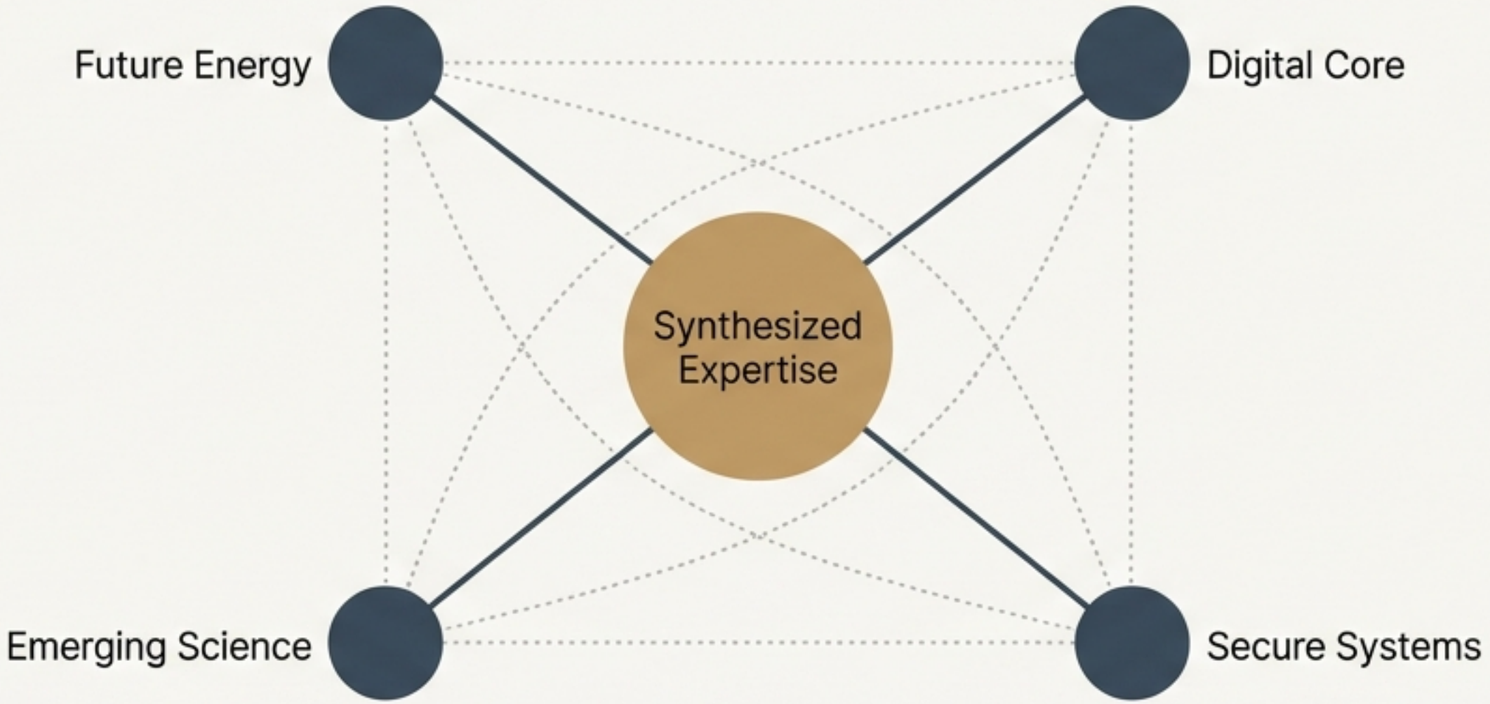
The Synthesis: Integrating Disparate Domains into a Cohesive Framework



Knowledge of individual domains is valuable. The ability to synthesize them is transformative. The culmination of this journey is the development of integrated frameworks that then that bridge technology, education, and policy—transforming research into practice.

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Capstone Project: An Integrated Curriculum Framework for Engineering & Technology

Source: Proposal to the ISC2 Security Congress 2025

Presentation Proposal ID: 2070815

Thesis Master Engineering Thesis Master Doctoral Engineering Electrical Subject Curriculum Framework Qualification Education Technology

> At the heart of solutions to framework qualification and national trade implementation sub-sector training.

- A framework integrating the design and stability of electrical trade systems with information systems, electrokinematics, and physical state engineering science.
- Aims to address real-world challenges like loadshedding by connecting theoretical trade knowledge with practical manufacturing and inventory systems.

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Connecting Theory to Practice: Engaging with National and Global Institutions

A framework's true value **is realized through its application**. This requires active engagement with the regulatory bodies, industry leaders, and public institutions that shape our technological landscape.

Regulatory & Educational	Industry & Utilities	Global Technology	Security & Law
DHET (Department of Higher Education and Training)	Eskom	Microsoft	ISC²
SAQA (South African Qualifications Authority)	City Power	Schneider Electric	Metropolitan Police (UK)
Umalusi	SABS (South African Bureau of Standards)		

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A Record of Proactive Engagement

Exhibit A: Industry Applications

Dear Tshingombe Tshitadi ,

Job Reference: Snr Advisor SDL&IPL
Position: Senior Advisor Supplier Development, Localisation and Industrialisation x2, Generation, sharepoint@eskom.co.za

Hi Fiston Tshingombe teodor,

Thank you for your interest in a career at Microsoft. Unfortunately, we will not be moving forward with your candidacy...

Exhibit B: Regulatory Correspondence

SABS

Online Enquiry

Submission Confirmation

The online Enquiry form sertem submissed to tiaing a [redacted] and is poietioot tna awi stoerkdrnal informatiens. 4te confirm to recommodate informatien and ose to a vasid-tis-eixn mnaatia.

Subjsct:	Complaint
Company:	Tshingombe assessment engineering electrical
Products / Certifiey number:	[redacted]
Products / Certification:	Trade engineering electrical research city power
Compans namda:	

Exhibit C: Security & Policy Engagement

METROPOLITAN POLICE

Search

Home > Request an intellectual property (IP) licence

Request an intellectual property (IP) licence

Thans,

Thank you for registering for Removing Barriers to Law Enforcement Officer Accountability.

Exhibit D: Professional Certification

ISC2®

ISC2 proposal submission confirmation

Presentation Proposal Status: Complete
Presentation Proposal ID: 2070815

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The Value Proposition: A Modern Polymath Engineer

The rare ability to architect and lead complex, multi-disciplinary projects by integrating deep technical knowledge across foundational engineering, digital systems, and emerging science.

From Foundation to Frontier

Moves seamlessly from low-level circuit design and mechanical principles to high-level architecture involving AI, Quantum, and DLT.

System-of-Systems Thinking

Understands not just individual components, but how they connect and interact within a larger technological, economic, and regulatory ecosystem.

Bridging Academia, Industry, and Policy

Proven ability to translate theoretical research into practical educational frameworks and engage with the institutions necessary for implementation.

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The Ultimate Goal: Translating Research into Practice

> Traditional scholarly communications... are not designed for influencing broad audiences. But they do provide the basis for telling **persuasive stories** around research: adding context... and fleshing out the potential **impact** (how things could improve if the research was put into practice).

The objective is to enhance **cognitive accessibility**—making complex, integrated knowledge understandable and actionable, and thereby empowering the next generation of engineers, policymakers, and innovators.

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